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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,319	02/13/2004	Michael E. Dresser	OMRF:014US	5215
32425 7590 :02/06/2008 FULBRIGHT & JAWORSKI L.L.P. 600 CONGRESS AVE. SUITE 2400 AUSTIN, TX 78701			EXAMINER CHAWAN, SHEELA C	
			ART UNIT 2624	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/779,319

Applicant(s)

DRESSER ET AL.

Examiner

Sheela C. Chawan

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/12/07.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9 and 20-24 is/are rejected.
- 7) ☒ Claim(s) 7, 8 and 14-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This office action is in response to applicant's arguments filed 11/12/07.
Claims 1-24 are pending in the present application.

Response to Arguments

2. Applicant's arguments, see pages 10-12 of the remarks, filed 11/12/07, with respect to the rejection of claims 5, 7-8, 10-19 and 23 under 35 USC 102(b) and 103(a) have been fully considered and are persuasive. The rejections of 5, 7-8, 10-19 and 23 have been withdrawn.

However, applicant's arguments regarding rejection of claims 1-4, 6, 9, 20-22 and 24 under 35 USC 102(b) have been fully considered but they are not persuasive.

Regarding claim 1, the examiner agrees with the applicant that the examiner misinterpreted the limitation of "displacing the image device while acquiring an image" (page 2 of the remarks). Furthermore, applicant argues that Carrington does not disclose the above limitation. However, examiner disagrees because Carrington clearly discloses at column 2, lines 27-29-34 that the optical system can include a lens and the multiple digitized images are generated by adjusting a position of the lens relative to the object. Here the imaging device is a lens which is **adjusted** during imaging of the object **in horizontal or z-direction** as shown in Figure 1. Therefore the adjustment of the lens indirectly provides the displacement of the imaging device during imaging in a single direction, such as horizontal or z-direction as shown in Figures 1-2. Furthermore, Carrington clearly explains at column 6, lines 49-63, how lens 20 is adjusted along z-

axis (single direction) for obtaining images of the object. Therefore, Carrington clearly meets the claimed limitations of claims 1, 20 and 24.

Similarly for claim 2, the applicant argues that Carrington does not disclose "varying the focus of an imaging device while acquiring an image of an object" (page 3 of the remarks). However, the examiner again disagrees because Carrington clearly disclose these features as explained above. The lens 20 has a focal length "f" as shown in Figures 1-2 and by changing the lens position automatically focusing adjustment of the imaging device is done during obtaining the images of the object.

Regarding claim 3, the applicant argues the Carrington does not mention of dimensions of the object (page 7 of the remarks). The examiner would like to remind that Carrington does teach this limitation at column 6, lines 49-51 by reconstructing a three dimensional images of the sample.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention Was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 6, 9, 20-22 and 24 are rejected under 35 U.S.C. 102 (b) as being anticipated by Carrington ET al., (US. 5,737,456).

As to claim 1, Carrington discloses an imaging method (fig 1, column 4, lines 37-46) comprising: displacing an imaging device in one dimension while acquiring an image of an (column 4, lines 37- 62) object, thereby blurring the image (column 8, lines 28- 65); and deconvolving the blurred image to generate a multidimensional (column 2, lines 34- 41) representation of the object (NOTE, Carrington clearly discloses at column 2, lines 27-29-34 that the optical system can include a lens and the multiple digitized images are generated by adjusting a position of the lens relative to the object. Here the imaging device is a lens which is **adjusted** during imaging of the object **in horizontal or z-direction** as shown in Figure 1. Therefore the adjustment of the lens indirectly provides the displacement of the imaging device during imaging in a single direction, such as horizontal or z-direction as shown in Figures 1-2. Furthermore, Carrington clearly explains at column 6, lines 49-63, how lens 20 is adjusted along z- axis (single direction) for obtaining images of the object. Therefore, Carrington clearly meets the claimed limitations of claims 1, 20 and 24.

As to claim 2, Carrington discloses an imaging method comprising:
varying the focus of an imaging device (column 3, lines 10-16) while acquiring an image of an object (column 4, lines 37- 62), thereby blurring the image (column 8, lines 28- 65); and deconvolving the blurred image to generate a representation of the object (column 6, lines 35-63, note, Carrington does not disclose "varying the focus of an imaging device while acquiring an image of an object" (page 3 of the remarks).
However, the examiner again disagrees because Carrington clearly disclose these features as explained above. The lens 20 has a focal length " f " as shown in Figures 1-2

and by changing the lens position automatically focusing adjustment of the imaging device is done during obtaining the images of the object.

As to claims 3 and 21, Carrington discloses the method of claim 2, the representation comprising a two dimensional projection image of three dimensions of the object (column 1, lines 28- 41, note, Carrington does teach this limitation at column 6, lines 49-51 by reconstructing a three dimensional images of the sample).

As to claims 4 and 22, Carrington discloses the method of claim 2, the imaging device comprising a fluorescence-imaging device (column 2, lines 34- 41, 48- 50, column 3, lines 20-23, column 5, and lines 1-2).

As to claim 5 Carrington discloses the method of claim 2, varying the focus occurring while a shutter of the imaging device is open (column 8, lines 45- 49).

As to claims 6, Carrington discloses the method of claim 2, varying the focus comprising varying an input voltage to a piezoelectric focusing mechanism of the imaging device (column 5, lines 3-11).

As to claim 9, Carrington discloses the method of claim 2, acquiring the image being accomplished in two or more stages (fig 1, column 9, lines 32- 65). As to claim 20, see the rejection of claim 1 above.

As to claims 20 and 24, see the rejection of claim 1 above.

4. Claims 10, 12-13, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carrington et al., (US. 5,737,456), as applied to claims 1-6, 9, 20-22 and 24 above and further in view of Subbarao (US.5,193,124).

Regarding claim 10, Carrington discloses an imaging method comprising:

(a) collecting an acquired image of an object using an imaging device (Carrington clearly discloses at column 2, lines 27-29-34 that the optical system can include a lens and the multiple digitized images are generated by adjusting a position of the lens relative to the object. Here the imaging device is a lens which is **adjusted** during imaging of the object **in horizontal or z-direction** as shown in Figure 1. Therefore the adjustment of the lens indirectly provides the displacement of the imaging device during imaging in a single direction, such as horizontal or z-direction as shown in Figures 1-2. Furthermore, Carrington clearly explains at column 6, lines 49-63, how lens 20 is adjusted along z- axis (single direction) for obtaining images of the object.

(b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image (column 3, lines 10-16, column 4, lines 37- 62, column 8, lines 28- 65);

(c) determining a point spread function (PSF) associated with the imaging device (abstract, column 30, lines 53-68);

Carrington is silent about (d) determining an optical transfer function (OTF) using the PSF;

(e) determining an object estimate;

(f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;

(g) comparing the estimated image with the acquired image to obtain a ratio;

- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (0 through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate.

Subbarao discloses Computational methods and electronic camera apparatus for determining distance of objects, rapid autofocusing, and obtaining improved focus images. The system comprises of:

- (d) determining an optical transfer function (OTF) using the PSF (column 7, lines 7- 22);
- (e) determining an object estimate (column 9, lines 17- 48);
- (f) convolving (column 22, lines 15-60) the object estimate with the PSF, using the OTF, to generate an estimated image (column 26, lines 51-61, column 27, lines 6-38, column 34, and lines 31-44);
- (g) comparing the estimated image with the acquired image to obtain a ratio (column 35, lines 45- 50);
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio (column 20, lines 33- 65);
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate (column 27, lines 6-38, column 41, and lines 13- 54);

(j) repeating steps (0 through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate (column 27, lines 6-68, column 28, lines 1-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Carrington to include an optical transfer function (OTF) using the PSF. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Carrington by the teaching of Subbarao in a single constraint as opposed to two or more required in the prior, thus reducing the computational cost of solving the constraint. This constraint is expressed directly in terms of the observed images and the camera parameters. No intermediate parameters (e.g., the standard deviation of the PSF distribution), as suggested by Subbarao at column 13, lines 13- 20).

As to claim 23, see the rejection of claim 10 above.

As to claim 12, Subbarao discloses the method of claim 10, the imaging device comprising a photosensitive camera chip (column 16, lines 54- 59):

As to claim 13, Subbarao discloses the method of claim 10, collecting the acquired image comprising stopping a continual clearing of the imaging device (fig 2).

Allowable Subject Matter

5. Claims 7 – 8 and 14-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is. 571-272-7446. The examiner can normally be reached on Monday - Thursday 7.30 - 6.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eileen Lillis can be reached on 571-272-6928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sheela Chawan
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Group Art Unit 2624
Jan 29, 2008

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PRIMARY EXAMINER